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ABSTRACT: Looking to answer ancient questions about the similarities and differences between humans and nonhuman animals, animal cognition scientists have deployed a traditional Aesopian fable, the Crow and the Pitcher, as narrative frame and structural precedent for experimental investigation. Herein, I consider the theoretical implications of this peculiar intersection between folklore and science in the contexts of Alan Dundes's notion of folk ideas (1971) and folkloristic genre theory. Ultimately, I gauge whether the so-called Aesop's Fable Paradigm is simply a folkloric cameo in science or a more complicated case of genuine scientific folklore.

IN A 2009 issue of *Current Biology*, scientists Christopher David Bird and Nathan John Emery published a compelling study on birds' problem-solving behaviors: "Rooks use Stones to Raise the Water Level to Reach a Floating Worm." Therein, Bird and Emery detail their findings that captive rooks, which have been trained to drop stones via a cleverly designed collapsible platform task, will—when faced with the problem of an out-of-reach worm floating on the surface of the water in a partially filled tube—displace the water by placing stones in the tube. Raising the water level in this manner, the rooks successfully obtain the worm. The scientists frame their work in the context of a well-known Aesopian fable, the Crow and the Pitcher:

The results of these experiments provide the first empirical evidence that a species of corvid is capable of the remarkable problem-solving ability described more than two-thousand years ago by Aesop.

What was once thought to be a fictional account of the solution by a bird appears to have been based on a cognitive reality. (2009, 1411)¹

Inasmuch as the Aesop's Fable experiment demands attention from both sides of the humanist/scientist divide, it also represents the conglomerate of ancient, pervasive questions we humans ask ourselves about the inherent similarities and differences between people and nonhuman animals. Oversimplifying, I will refer to this amorphous, unwieldy set in the singular as the animal question.

Animals surround us. Animal studies continue to sweep across the face of humanistic and so-called posthumanistic scholarship; contemporary debates concerning ethical treatment of nonhuman animals rage on in both scholarly and legal environments.² Animal presence in popular culture is nearly too pervasive to summarize. Alongside Animal Planet and cute dog memes, I could not help but notice that in 2017 (the year after our 2016 American Folklore Society panel on the Aesop's Fable Paradigm that gave rise to this special issue), *Time* magazine, *National Geographic*, and *Scientific American* all published special issues on animals—respectively, *The Animal Mind: How They Think. How They Feel. How to Understand Them*; *Inside Animal Minds: What They Think, Feel, and Know*; and *Secret Lives of Animals: Strange True Tales from the Wild Kingdom*.³ Whether we are children being told a traditional animal tale, or children watching videos of anthropomorphized cartoon animals; whether we are scientists comparing cognition between children and chimpanzees, or philosophers pondering the mental states of physical and subjective self-awareness in species ranging from elephants to ants; whether we are biological anthropologists doing fieldwork in some remote forest, or animal rights activists fighting for more humane treatment of domesticated livestock; whether we are folklorists hoping to understand the complexities of human representations of animals in totemic material culture and traditional narratives, or even if we are simply dog owners trying to house train our family pet, it seems we cannot stop ourselves from asking the animal question.

More germane to our topic, Bird and Emery's Aesop's Fable experiment joins the litany of animal questions asked in the scientific investigation of animal cognition. Folklorists and humanists looking for an accessible entry into the history of animal science in psychology will find a short, but culturally insightful, discussion in Graham Richards's chapter on the "Psychological Uses of Animals" in his

Putting Psychology in Its Place ([1995] 2010). Therein, Richards identifies ways that animals are used by psychologists:

- 1) To trace the evolutionary roots of human behavior.
- 2) As “behavioral units” for studying something called “behavior.”
- 3) As sources of insight into behavioral dynamics, especially social dynamics.
- 4) To trace the borderline of what is distinctively human. (234)

Scientists have in recent years published more than thirty variants of the original Aesop’s Fable experiment, featuring different animal species as well as human children. Taken together, they constitute, for the scientists, an experimental paradigm.⁴ The Aesop’s Fable Paradigm fits easily into Richards’s second category as it studies problem solving behavior in the contexts of causal regularities, into the first category as it studies the breadth of similar problem solving abilities across a range of distantly related species, and into the fourth as it compares the performance of crows and other animals with the performance of human children.⁵

The Aesop’s Fable Paradigm’s source of inspiration, however, seems to also fit the experiments into Richards’s category 3—though probably not in any way that the scientists intend. That is, while the Aesop’s Fable Paradigm does not explicitly test the crows’ social behaviors, the paradigm may yet tell us something about the social dynamics of people.⁶ Richards observes that the entire topic can be viewed “as an expression of the intrinsic psychological significance of animals for humans” ([1995] 2010, 240). He adds, “The fact that modern Psychology is still involved in this game, at however a sophisticated level, further testifies to the inseparability of Psychology [the discipline] and psychology [i.e., the psychology of psychologists]” (240). And here, another—more folkloristic—question emerges: As a presentation of human psychology, can we consider the Aesop’s Fable experiments as scientific culture reflecting a more genuine kind of folklore?

We can safely say that, broadly considered, scientific paradigms have been conceptualized as at least partially constituted by the socio-culturally maintained ideas of scientists since, at least, the work of Thomas Kuhn, and the Aesop’s Fable Paradigm is clearly folklore in science in at least one sense—as the transposition of a traditional narrative.⁷ But is the Aesop’s Fable Paradigm folklore in science in

another sense—as the distilled presentation of communal answers to the animal question, answers such as animals are similar to humans, animals solve problems in human-like ways, animals behave in ways that seem analogous to humans because their inner-workings are similar to humans’ inner-workings, animals are like children, animals *and* children are just simplified adult humans? I argue that it can be, and if we desire a folkloristic name for these communally maintained, scientific answers to the animal question, Alan Dundes’s *folk ideas* could serve.

For Dundes, folk ideas are “traditional notions that a group of people have about the nature of man, of the world, and of man’s life in the world” (1971, 95). On one hand, any serious answer to any iteration of the animal question is likely to overlap with the parts of Dundes’s definition that deal with nature and human life in the world. On the other hand, it remains unclear whether we should think of the scientists’ answers as traditional folklore. We would dangerously stretch the reach of folkloristic thinking, for example, by categorizing experimental investigations in science as a genre of folklore (consider the issues of anonymity, communal ownership, variation, etc.). But it is important to keep in mind, here, that Dundes was not thinking in terms of a genre: “Folk ideas would not constitute a genre of folklore but rather would be expressed in a great variety of many genres” (1971, 95). As a matter of fact, Dundes frames his entire premise of folk ideas with a critique of genre-theory: “Despite the practical necessity of defining and refining genre categories, the fact remains that the folklorist’s habit of thinking of his field almost exclusively in terms of traditional genres tends to be a limiting one” (94). Perhaps, we can thread the needle. Since the scientists *have* co-opted a fable for their experimentation, I suggest we use genre-theory as a folkloristic point of view from which we can search for cryptic expressions of folk ideas in the Aesop’s Fable Paradigm.

The Crow and the Pitcher is an animal tale, a fable; how has this fable become science? It is an arresting question because we must face a certain amount of surprise before setting out for sober answers. We are—of course—surprised and impressed that Bird and Emery’s clever crows are capable of, at least, some form of goal-directed problem solving that allows them to obtain the floating worm. But, if we are being honest, folklorists are also surprised because we have learned that the behavior of an animal character in a well-known fable has been actualized in scientific experimentation. Discomfort follows

surprise as we realize that the fable has suddenly been ripped from its ancient discursive function as a fantastic rhetorical device that, William Hansen teaches us, was meant to “exemplify a proposition metaphorically” *and* from its traditional literary function as a piece of short fiction meant to express an “explicit moral” (1998, 259–61). Variability and context shifts are not newly recognized phenomena, but a fable being forced into dialog with the scientific arbitration of veridical reality raises other issues for genre theory.

Consider the problems that arise when we invert our truth evaluation by describing the Crow and the Pitcher as a mere fictional, and ultimately flippant, account of a bird solving a problem. So much analysis tells us that literal interpretations—based upon veridical truth values—miss implied truths and cultural commentary embedded within the semantics of traditional narratives—not to mention the sociocultural contexts of any given telling. The Crow and the Pitcher is cataloged in the *Motif-Index* as an example of Wisdom Gained from Experience (J101), and modern literary variants of the fable often express a moral concerning the nature of problem-solving, such as *Where force fails, patience will often succeed*; or *With a little planning, you can gain what at first seems impossible*; or a frequently attributed version of the moral, which Bird and Emery cite in their conclusion, *Necessity is the mother of invention*:

Aesop used his fable to ascribe the moral that “necessity is the mother of invention.” Our evidence suggests that in this case, it is cognitive generalization that may provide the toolbox from which the solution could be drawn. (2009, 1412)⁸

In this case, the reflexivity embedded in the moral seems to engulf both the narrative plot of the fable *and* the breakthrough that made the fable scientifically relevant, for the “invented” experimental design “has proven useful for testing whether tool-using and non-tool-using birds understand the causal properties of objects, as well as comparing their understanding with that of human children” (Emery 2016, 132).⁹ Suddenly, the Aesop’s Fable Paradigm’s professed topics of birds’ causal understanding of water displacement become fully intertwined with folk ideas about the mind, such as parents mentally invent their offspring, or mental problems are solved in ways analogous to physical problems, or both mental and physical problems are solved with tools.

That we are dealing with folk ideas about the mind is important precisely because the correlative “findings” associated with the Aesop’s Fable Paradigm claim discovery of a staggering set of mental abilities in the birds, such as insight and a complex understanding of the physics of water displacement. Some authors go so far as to compare the crows’ understanding of causal relationships in the physics of water displacement to five-, six-, and even seven-year-old children. If comparisons to seven-year-old children raise the stakes in these experiments, they also prompt another serious question for folklorists. In the contexts of contemporary print traditions, in which Aesop’s Fables most frequently appear in children’s literature, the folk—we presume—immediately recognize that the anthropomorphized actions of animal characters in a fable say more about the world of humans than they do about the real-world animals the characters represent. Take, as a bit of evidence, a seven-year-old’s impromptu recitation of “The Tortoise and the Hare” published by the scientifically well-versed folklorist Brian Sutton-Smith in *The Folk Stories of Children* (1981):

Once upon a time there was an ox and a tortoise. And they were fighting over to see who was the fastest. So they decided to have a race. So the rabbit ran as fast as he could when he saw the tortoise. So the ox laid down and took a nap. And when he woke up he saw the tortoise three miles away from him. And then he ran as fast as he could. Before he could reach the finish line the tortoise won. And he saw the tortoise taking home diamonds and diamonds and diamonds. And he was so mad that he went to the manager and the ox said, “I demand this money!” But the mayor said, “But Ox, the tortoise won so he gets the money.” But the rabbit ran as far as he could and nobody ever saw him again. And that was the end of the rabbit. And the tortoise stayed rich and rich. The end. (121)

The fables humans tell are not *actually* about animals’ physical speediness or mental capabilities for insight. They *actually* concern human ideas about perseverance, mindset, or in the case of the seven-year-old’s story above—the monetary success that accompanies sustained effort. Why would these core elements of the fable—as humans perform these elements—be overlooked in a truly comparative science?

To be fair, scientists working in the Aesop’s Fable Paradigm must constrain their investigations in order to test for birds’ and children’s understanding of the regularities among causal relationships

in the physical world. Because children are still developing and only recently linguistic and because crows are always nonlinguistic and a completely different species, it is not easy finding workable comparative scenarios. Lead psychologist Sarah Jelbert from the University of Auckland and her coauthors communicate these complications in the introduction to their 2014 study, “Using the Aesop’s Fable Paradigm to Investigate Causal Understanding of Water Displacement by New Caledonian Crows”:

As adult humans we are capable of recognizing that objects in the world behave in predictable ways. For example, we know that two objects cannot occupy the same space, round objects will roll down hills, and heavy objects sink in water. Many of these expectations are present very early in life, whilst others emerge and evolve over the course of development. It is easy to imagine that an ability to attend to causal regularities in the world, and to understand the forces underlying them, would have adaptive significance for many animal species. Whether animals do attend to causal regularities has been studied using various methodologies in different species. However, finding comparative tasks to assess how causal information is processed by different species can be difficult. Existing tasks are often tied to specific ecologically relevant behaviors such as tool use, involve face-to-face interactions with humans, or are too cognitively challenging to be attempted by more than a select few animals. (2014, 1)

The authors go on to praise the Aesop’s Fable tasks as “a more informative paradigm for testing causal understanding across a wide range of species” (1). Adding, “The strength of [the paradigm] is [its] ability to examine the reaction of animals to novel problems that are not related to the animal’s habitual or customary tool use behaviors” (2). So again, why or how has a fable risen to the position of *bona fide* scientific paradigm? One possibility, the one expressed in these scientists’ passages, is that the narrative actions of the fable actually provide a strong scientific hypothesis for realizable behavior in the real-world version of the fable’s featured animals that—even more importantly—is not already found in the real-world animal’s natural behavior.

Before we begin the process of creating a new motif category—*animal behavior demonstrating possible scientific breakthrough*—let us rest on old ideas and consider another possibility: The Aesop’s Fable Paradigm’s roots in folklore—not the experimental design hidden in its narrative—have fueled its rise to scientific fame. To address this

possibility, we can conduct our own thought experiment of sorts by considering competing possible explanations for the experimental data. After publishing the study mentioned in the previous paragraph, Sarah Jelbert with Alex Taylor and Russel Gray reconsidered possible explanations for the Aesop's Fable Paradigm one year later in a review article for *Communicative and Integrative Biology*. Early in that review, the authors introduced the paradigm as possible evidence for insight:

In the classic fable, Aesop's clever crow insightfully recognized that stones would displace water and raise the water level in the pitcher. To examine whether corvids could indeed find such ingenious solutions to problems, Bird and Emery provided rooks with a pile of stones and a tube of water containing a floating worm; examining whether they would spontaneously drop stones into the tube to bring the worm within reach. In line with the fable, and seemingly insightfully, the rooks picked up the stones and dropped them into the tube, some of them on the very first trial. (2015, 1)

The doubly-adverbial phrase, *seemingly insightfully*, jumps out. It is an important expression of the Aesop's Fable tasks' typically intended outcome—to demonstrate higher-order, human-like insight in corvids.

Now, let us introduce ourselves to a possible alternative explanation that Jelbert and her colleagues note “could account for the birds' performance on all tasks”: *the perceptual-motor feedback hypothesis*:

[*Perceptual-Motor Feedback* involves] repeating actions which bring the reward incrementally closer, coupled with the crows' goal-oriented behavior. Unlike an account which relies on insight or mental scenario building (imagining to some degree the effect that stones will have on the water level of the tube, before acting) the perceptual-motor feedback hypothesis proposes that a bird first recognizes the effect that dropping a stone has on the position of the reward after each stone has been dropped, then repeats those actions which bring the reward closer. In this case, birds do not need to understand any aspect of water displacement. (2015, 4)

In the context of these competing explanations, we must ask, “Why don't more of these studies lead with the perceptual-motor feedback hypothesis as a sufficient explanation of the involved behaviors?” Nothing in the perceptual-motor feedback hypothesis excludes the obvious fact that crows—endowed with their unique set of mental

tools—are powerful problem solvers. The hypothesis does not downplay the crows' intelligence, and the scientists, here, admit that first-order feedback *does* provide a viable alternative explanation for the crows' behavior. Returning to our thought experiment, it is important to note that we do not need to accept the perceptual-motor feedback hypothesis as objective truth. In fact, we could imagine an infinite amount of equally plausible (but never completely confirmable) hypothetical explanations for the crows' abilities. Given this infinite set of possible scientific explanations, we need only ask ourselves if it is important that one interpretation of the data—the one that aligns the mental processes governing the crows' behavior with the mental processes governing humans' behavior—also aligns with the morals of the fable? My answer is yes. As Gregory Schrempp puts it, “traditional gestures and genres . . . have always radiated power and appeal” (2014, 1).¹⁰

Ultimately, the animal question persists precisely because the problems it foregrounds are difficult to solve. The rise of the Aesop's Fable Paradigm simultaneously raises the possibility that scientific work on animal cognition is exceedingly difficult to parse because of the weight attached to animals (both real and symbolic) in human culture. Folklorists who read headlines about crows being smarter than seven-year-old children should seriously consider the science, in scientific *and* folkloristic terms, before mistaking sweeping comparisons of mental processes across species for (objective) truth. It remains entirely possible that scientific focus on insight or on some other human-like causal understanding of water displacement in the Aesop's Fable Paradigm has more to do with the traditional content of the morals and the lessons implied by the narrative structure of the fable than it does with the actions of the real-world crows. By framing their studies with the contents of a fable, scientists imply that any rook or crow that can solve the problem of raising and receiving the worm must understand—on some level—that the state of being in need is best approached as an opportunity to think creatively, that we must invent fresh solutions in order to persevere, that we should think outside of the box, that we can employ mind over matter, that an entire host of complementary folkloric ideas are applicable to the experimental situation.

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Notes

1. In a preceding section, Bird and Emery recognize that a previous study by Mendes, Hanus, and Call, “Raising the Level: Orangutans use Water as a Tool” (2007), involved orangutans spitting mouthfuls of water into a plastic tube in order to raise the water level and retrieve a floating peanut. While Mendes et al. do mention the Crow and the Pitcher in the text of their publication, they do so only passing. Their title, for example, does not mention the fable. Commenting on the relative quality of the evidence for tool use, Bird and Emery note that the orangutan experiments were “not directly analogous to Aesop’s fable—in Aesop’s fable, the water was not transported to the pitcher but was already present. Thus, the water in Aesop’s context does not fit the standard definitions of a tool; rather, the stones are used as tools acting as displacing agents on a medium that can be manipulated by these agents” (2009, 1412). They make no mention in this section of the incongruity that is the absence of a food reward floating atop the water’s surface in the typical Aesop’s version of the fable.

2. In an instructive 2009 *PMLA* article, Cary Wolfe, deftly captured the essence of animal studies when he likened summarizing the burgeoning field to “herding cats” (2009, 564). Therein, Wolfe lists off a range of cultural arenas that commonly feature discourse on animals, including Western literature, art, and culture; “non-Western literature and culture, written and oral”; philosophy (continental and analytic); legal debates concerning animal rights (and personhood); television shows; and “last but certainly not least,” food (564–65). Wolfe is not gesturing toward this complex web of animal discourse in service of simplistic demonstrations, he is, in fact, worried as the article’s title suggests that the entire enterprise may be “Human, All too Human.”

3. *Time*’s special issue was actually an updated reissue from 2014 edited by Jeff Kluger. *Scientific American*’s special issue was released in the spring of 2017, and *National Geographic*’s was released in the summer of 2017.

4. For folklorists unfamiliar with experimental studies, here is a good, textbook definition of *experimental paradigm*:

An experimental paradigm is a model of research that is copied by many researchers who all tend to use the same variables, start from the same assumptions, and use similar special procedures. Those using the same paradigm tend to frame their questions similarly. Examples of experimental paradigms in psychology are rats (or pigeons) in a Skinner box pressing a lever (or pecking a key) for food or water that is usually contingent on some aspect of the response, human subjects using paired nonsense syllables (or word pairs, or picture word pairs, etc.), rats being run through mazes, and ablation techniques to localize brain functions. (Levine and Parkinson 1994, 352)

5. Of these four uses, Richards identifies one common assumption: “Namely, that animal behavior is somehow simpler than ours, though how precisely this simplicity is conceptualized varies, and sometimes the aim is to show that it is less simple than hitherto assumed” ([1995] 2010, 234). Breaking down such apparent binaries remains an obstacle for scientists working with animals.

6. Of course, in other experimental paradigms, such as the seed-caching Theory of Mind studies, scientists have explicitly studied the social behavior of crows and other corvids. See, for example, Dally et al. (2009).

7. I thank Jay Mechling for his insightful suggestions on the intermingling of science and scientific culture. For an excellent folkloristic consideration of the topic as it relates to Kuhn's work, of the strong program in the sociology of science, and of scientists' folkloric play, see Mechling's "Homo Ludens Subsp. *Scientificus*" (1984). Especially pertinent are Mechling's thoughts on the artificiality of the distinction between "the context of discovery and the context of justification in science" (265).

Using Franz Boas and Alan Dundes as case studies, folklorist Rosemary Zumwalt (2013) has recently reimagined Kuhn's notion of a "disciplinary matrix" in close proximity to folklore while examining the roles that charismatic leaders play in the development and progress of academic disciplines.

8. Generally, neither this nor any other moral appears in the associated published studies of the Aesop's Fable tasks.

9. This commentary on the Aesop's Fable task appears in Nathan Emery's book, *Bird Brain: An Exploration of Avian Intelligence* (2016). The book, which purposefully straddles the line between science and popular science, allows for a plethora of playfully anthropomorphic references, such as "Geese Ganging Up," "Machiavellian Maneuverings," "Do Birds Believe in Magic?" Interestingly, the book's primary antagonist is, in fact, the folk idea associated with the term, *bird-brains*: "It is time we stopped using the derogatory term 'birdbrain.' Studies of birds have exposed intimate details of their complex social and emotional lives" (182).

10. In his introduction to *Science, Bread, and Circuses* (2014), Schrempp reminds his readers that folkloric/popular influencers on science and scientific worldviews are neither new nor emergent. They are, instead, old and pervasive.

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